

CONSTANT SPEED CRUISE SYSTEM

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GENERAL INFORMATION

General Information

Description

Turn on the constant speed cruise control switch after vehicle reaches a certain speed, and the set vehicle speed can be maintained by constant speed cruise control, without accelerator depressed via related setting. When active speed limit function is turned on and set, vehicle speed does not exceed the speed limit set. Cruise control system consists of the following components:

- Constant speed cruise control switch (multi-function switch)
- Instrument cluster (ICM)
- Engine control module (ECM)
- Transmission Control Unit (TCU)
- ESP and EPB control module
- Accelerator pedal
- Brake switch
- Clutch Switch

Do not use cruise control in the following situations. Otherwise, it may result in a loss of vehicle control and cause an accident, resulting in serious injury or even death.

- In traffic congestion areas.
- On roads with sharp bends.
- On winding roads.
- On wet and slippery roads, such as those covered with rain, ice or snow.
- On steep hills. Vehicle speed may be higher (or lower) than the set speed. At this time, to ensure actual vehicle speed constant with current setting vehicle speed, rapidly acceleration operating condition will occur in short time. Driver will feel uncomfortable.

Operation

Engine Control Module (ECM) receives input signal from constant speed cruise control switch (multi-function switch), and then engine control module (ECM) turns on the indicator on the meter via CAN net. According to speed signal, brake signal, clutch signal, acceleration and deceleration signal and current working conditions, ECM determines whether to enter or cancel cruise state. After entering state, ECM controls throttle opening angle to stabilize the vehicle within the set vehicle speed range.

Constant Speed Cruise Operation Method

1. With ignition switch is ON, when the main switch button of cruise system is pressed, cruise indicator on the meter illuminates and blinks (pre-cruise state, normal condition). If the meter is color screen, it will be displayed on left bottom of the screen; When vehicle is driving at speed range of 40km/h-150Km/h, press SET/- button of cruise system, vehicle is driving constantly at the speed while the button is pressed (In this case, it is unnecessary to put your foot on the accelerator pedal. The cruise system adjusts throttle valve opening angle automatically according to road conditions). Meanwhile, cruise indicator on the meter is always on without blinking. It indicates entrance of cruise state; If indicator on the meter remains blinking, indicating cruise state has not been entered. Please operate again, to try to enter cruise state (if cruise state is still not entered, please check the cruise system for malfunction).



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2. Press the cruise main switch under the cruise state to cancel the cruise state and indicator on the meter turns off. Press the CANCEL button to cancel the cruise state and cruise indicator on the meter blinks. When pull up the EPB button, depress brake and clutch pedals, engine speed exceeds set range (600~6240), gear shift exceeds set range (1~6), and vehicle speed exceeds set range (35~155), the cruise state is canceled, and indicator on the cruise indicator blinks.
3. Under the cruise state, depress the accelerator pedal or brake pedal (Cruise indicator remains on during this procedure) to increase or decrease vehicle speed. Press SET/- button of cruise system while release the accelerator pedal or brake pedal, vehicle is cruising at new vehicle speed, and indicator on the meter remains on. If the meter is color screen, the new set speed will be displayed at left bottom of the screen.
4. Under the cruise state, short press RES/+ button once (over 0.02 second) to increases vehicle speed by 2 Km/h. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom will increases by 1 km/h; Under the cruise state, long press the RES/+ button (over 0.4 second) to accelerates vehicle continuously. Release the RES/+ button to stop acceleration, and vehicle is cruising under the speed while the RES/+ button is released. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom changes simultaneously with actual speed. (It is suggested not long pressing RES/+ button, because it will increase vehicle speed continuously and threaten to safety driving).
5. In the cruise state, short press SET/- button once (over 0.02 seconds) to decrease vehicle speed by 2 km/h. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom will decrease by 1km/h.
Under the cruise state, long press the SET/- button (over 0.4 second) to decelerate vehicle continuously. Release the SET/- button to stop acceleration, and vehicle is cruising at speed when the SET/- button is released. Cruise indicator on the meter remains on. If the meter is color screen, the target cruise speed displayed on left bottom changes simultaneously with actual speed.
6. In the cruise state, depress the brake pedal or clutch pedal to flash the cruise indicator on the meter (pre-cruise state, normal condition), and the vehicle speed decreases. When vehicle speed is over 40 km/h, release the brake pedal and press RES/+ button, then the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on. When vehicle speed is below 40 km/h, release the brake pedal and press RES+ button, the vehicle can not return to the cruise state before depressing the brake pedal. However, further depress the accelerator until vehicle speed is over 40km/h, release the brake pedal and press RES+ button, the vehicle accelerates until the cruise state before depressing the brake pedal is returned. Cruise indicator on the meter remains on.

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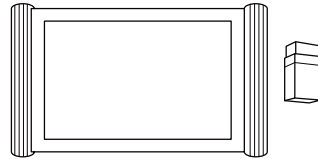
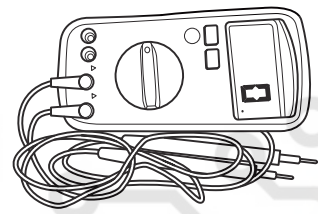
Specifications

Torque Specifications

Description	Torque (N·m)
Steering Wheel Quick Button	0.7 ± 0.2

Tools

General Tools

X-431 PAD Diagnostic Tester	 001
Digital Multimeter	 002

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Diagnosis Tools

Diagnostic Tester

When connecting the diagnostic tester:

- Connect diagnostic tester (the latest software) to diagnostic interface for communication with vehicle.
- Diagnostic interface is located on instrument panel lower left protector.

Digital Multimeter

When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- If malfunction is intermittent, perform the followings:
- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

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Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works. Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure all wire harnesses are clean, securely fastened with providing a good ground path.

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DIAGNOSIS & TESTING

Diagnosis & Testing

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Vehicle speed can not be set (Meter indicator does not illuminate)	Wire harness or connector
	Engine control module (ECM)
	Instrument cluster
Vehicle speed can not be set (Cruise/speed limit indicator illuminates normally)	Constant speed cruise control switch
	Wire harness or connector
	Brake switch
	ESP and EPB
	Clutch switch (for MT model)
	Body Control Module (BCM)
	Engine control module (ECM)

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Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the brake control system.

1 Vehicle brought to workshop

Result

Proceed to
Next

Next

2 Check battery voltage

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

Result

Proceed to
OK
NG

NG

Replace the battery

OK

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3 Customer problem analysis

Result

Proceed to
Next

Next

4 Check for DTCs (current DTC and history DTC)

Result

Proceed to
No DTC
Current DTC
History DTC

History DTC

5 Problem repair (no DTC), then go to step 8

Result

Proceed to
Next

Next

Go to step 6

6 Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 8

Result

Proceed to
Next

Next

Go to step 7

7 Troubleshoot according to Problem Symptoms Table, then go to step 8

Result

Proceed to
Next

Next

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8	Adjust, repair or replace
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Result

Proceed to
Next

Next

9	Conduct test and confirm malfunction has been repaired
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Result

Proceed to
Next

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Next

End

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ON-VEHICLE SERVICE

Constant Speed Cruise Switch

Removal

WARNING:

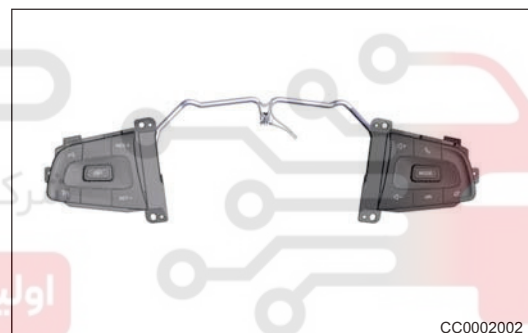
- Be sure to read precautions for SRS airbag before removing steering wheel multi-function switch.
- Be sure to wear necessary safety equipment to prevent accidents when removing constant speed cruise switch.
- DO NOT damage the clip on steering wheel multi-function switch quick trim cover when removing constant speed cruise switch.

1. Turn off all electrical equipment and the ENGINE START STOP switch.
2. Disconnect the negative battery cable for more than 1 minute.
3. Remove the driver airbag (See page 29-63).
4. Remove the steering wheel trim cover.
5. Remove the steering wheel multi-function switch.
 - (a) Remove fixing screws (arrow) from steering wheel multi-function switch with screwdriver.

Tightening torque

 $0.7 \pm 0.2 \text{ N}\cdot\text{m}$

- (b) Remove the steering wheel multi-function switch.



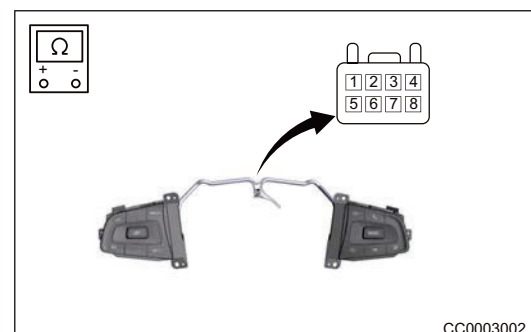
Inspection

1. Check the constant speed cruise switch.
 - (a) Check constant speed cruise switch for damage. Replace them if necessary.
 - (b) Check constant speed cruise switch connector for damage or poor terminal connection. Replace them if necessary.
 - (c) Using digital multimeter, check for continuity between the terminals of constant speed cruise switch according to the table.

Multimeter Connection	Condition	Operation Resistance in normal temperature (Ω)
Terminal 1 - Terminal 2	Cancel	470
Terminal 1 - Terminal 2	Cruise	1030
Terminal 1 - Terminal 2	RES/+	2030
Terminal 1 - Terminal 2	SET/-	2630
Terminal 1 - Terminal 2	LIM/OFF	7330

If result is not as specified, replace steering wheel multi-function switch.

2. Check connectors for damage. Replace if necessary.



Installation

1. Installation is in the reverse order of removal.

Caution:

- Operate carefully to prevent damage to other components, when installing the constant speed cruise switch.
- Install each connector into place when installing constant speed cruise switch.
- Tighten fixing screw to the specified torque when installing constant speed cruise switch.
- Check steering wheel multi-function switch for proper operation, after installing constant speed cruise switch.

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